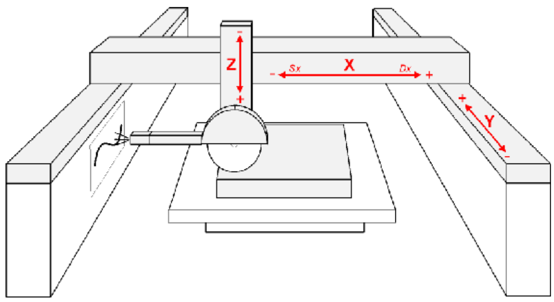
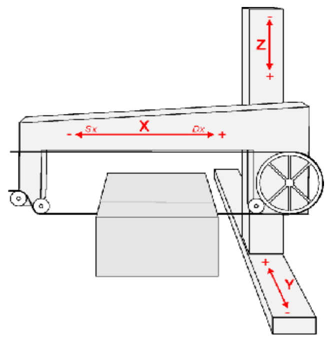
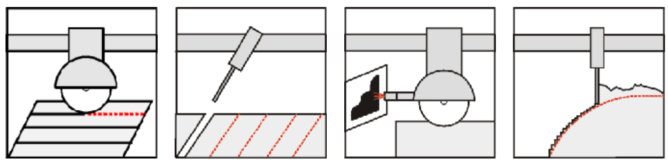
BLOCK CUTTER 3

Block cutter for marble and granite

User manual







MDU_BLOCKCUTTER03_EN - 04/05/2007

1. Information

Thanks for buying this QEM instruments. We'll be glad to receive any suggestion at our e-mail address info@qem.it.

1.1 Symbols

Not reading the message will be dangerous for the instruments integrity and/or for the success of the operation.

Note: Important information for the correct use of the instruments.

For more informations see the user manual indicated in the message.

For more informations see the indicated pages.

1.2 Limited Warranty

For two (2) years from the original acquisition, QEM will repair or replace for free controls and devices that QEM thinks be imperfect in materials or quality. This warranty is not valid if the object has not been tampered by not authorized persons or used in an inappropriate way.
This warranty replaces all other warranties either expressed or implicit.
QEM doesn't hold personally responsible for all charges (installation or uninstalling included), draw-back, or damage caused by our products, made or sold. In any case, QEM total duty, always will not exceed the control total price.
Claims for refunds of selling price, reparations, or replacements must be referred to QEM with all pertinent data (damage, purchase date, developed work and problem).
It is not provided any duty for batteries and fusible cut-out consumption.
The product must be returned only with a written notification, included the Number of Restitution Authorization QEM and must be paid all forwarding charges.

1.3 Reference Manuals

You should conserve all setting parameters and programming parameters in order to simplify the replacement and the service.

The documentation referred to the QEM instrumentation in divided in many issues that allows an easy utilization.

MIM - Base	**MIM - Base: Installation and maintenance manual** Instrument hardware and software information
MIM - Exp	**MIM - Exp: Expansions manual** Expansions hardware and software information.
MDU	**MDU: User manual** User information on the software.
MIMAT	**MIMAT: Service manual** Informations on: wiring, right calibration, parameters insertion and breakdown individuation.

It is possible to download manuals from www.qem.it

1.4 Validity

The present document is fully valid excepted mistakes or omissions.

Manual Release	Description	Date
1.0	New manual	07/02/05
1.1	Inclined cutting function added	09/06/05
1.2	Manual new version	07/04/06
1.3	New contents	12/04/06
1.4	BLOCKUTTER 3.7 new function added	29/05/06
1.5	BLOCKUTTER 3.9 new function added	29/11/06
1.6	Modify the name of the card at page 7	04/05/07

1.4.1 Trade Marks

Trade Marks:
- QEM® is a trade mark.

2. Description

The **BLOCKCUTTER03** software, installed on a micro Qmove D983 hardware, is realized to automatize a "block cutter" for marble or granite. It is possible to choose italian, english or portoguese language

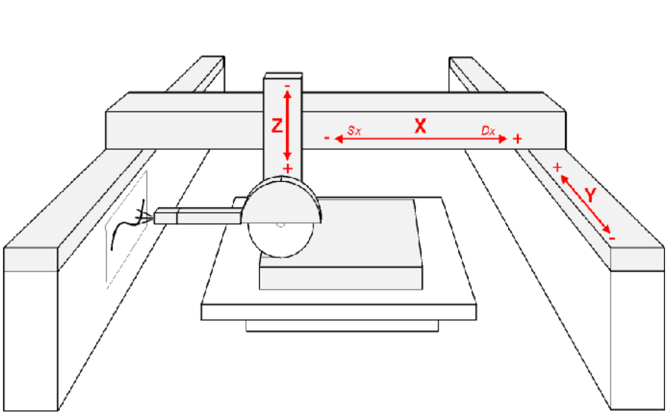


Fig. 1: Block cutter machine with disc tool

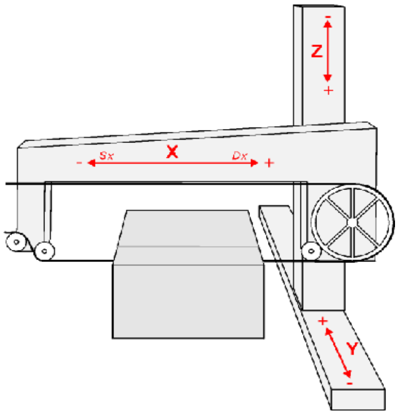


Fig. 2: Block cutter machine with diamond wire

Possible workings are:
- unloader;
- shape copying (self learning) with photocell;
- shape executing;
- multiple shape executing;
- inclined cutting, automatic calculating Y axis forwarding (bridge) and Z axis (cutting depth).;
- diamond wire cutting;
- cutting of multiple blocks (max 10);
- square shaping executing with fresa or polisher.

Possible mode workings are:
- tool choice (disc or diamond wire)
- multiple cuttings;
- settle cutting;
- single cutting;
- many times cutting;
- bilateral cutting;
- pilot cutting;
- "left and right" indipendent regulation of the lowering disc;
- X self-learnt limit switches;
- dynamic X limit switches;
- cutting speed limitation referred to the disc current;
- the instrument handles three axis motion "X-Y-Z" with only an inverter;
- cutting speed settings;
- The instrument signals anomalies with allarms (stop the machine) and messages in order to facilitate the individuation;
- the instrument handle 3 axis with only 2 counters inputs. Z axis counter is always connected. For X and Y it is used an automatig change handling.

Settings, signals, allarms:
- Direction of the last cut setting;
- Height of the last cut setting;
- Cutting speed settings and indipendent return;
- The instrument signals anomalies with messages and allarms in order to facilitate the individuation;
- I/O diagnostic.

3. Wiring

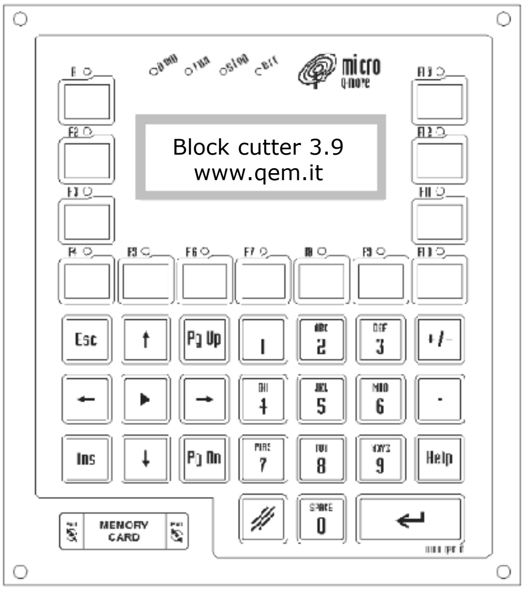


Fig. 3: Front view

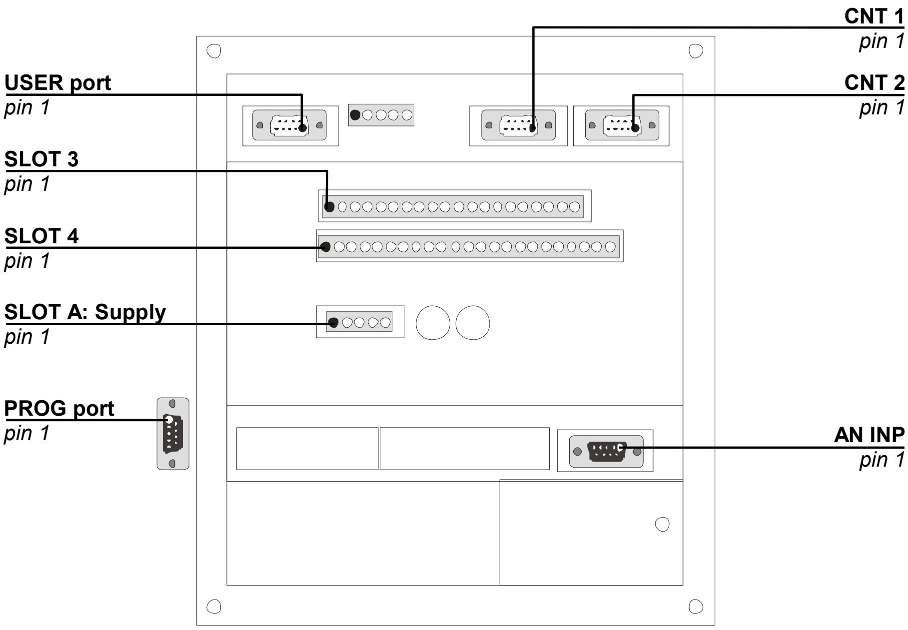
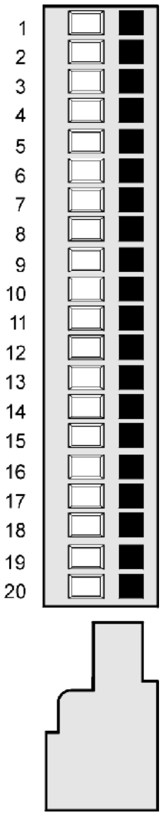


Fig. 4: Back view

For further information about cut-outs please read the D983 MIM-BASE.

3.1 Slot 3: L3-I17 card



Clip	Name	Logic activ. state	Contact	Activ. modality	Input	Description	
1	+ 12 Vdc	-	-	-	-	Out 12 Vdc	
2	0 V	-	-	-	-		
3	I0	ON	NO	C	-	Wire stretch mode OK (pag. 34)	
4	PL I0	-	-	-	-	Polarizer I0	
5	I1	OFF	NC	C	PNP	Forward	Limit switch X
6	I2	OFF	NC	C	PNP	Backward	
7	I3	OFF	NC	C	PNP	Forward	Limit switch Y
8	I4	OFF	NC	C	PNP	Backward	
9	I5	OFF	NC	C	PNP	Fall	Limit switch Z
10	I6	OFF	NC	C	PNP	Rise	
11	I7	OFF	NC	C	PNP	Automatic accord	
12	I8	OFF	NC	C	PNP	Emergency	
13	I9	ON	NO	I	PNP	Forward	Jog X
14	I10	ON	NO	I	PNP	Backward	
15	I11	ON	NO	I	PNP	Forward	Jog Y
16	I12	ON	NO	I	PNP	Backward	
17	I13	ON	NO	I	PNP	Fall	Jog Z
18	I14	ON	NO	I	PNP	Rise	
19	I15	OFF	NC	C	PNP	Unloader out of size *(pag. 29)*	
20	I16	ON	NO	C	PNP	Fast	Jog Speed selector
		OFF	NO	C	PNP	Slow	

I0: *interrupt input*
PL I0: *I0 interrupt input polarizer*
Ix: *digital inputs*

Logic activation state: *ON = activated on close contact;*
OFF = activated on a open contact.

Activation Modality: *I = pulsing signal;*
C= continuous signal.

Contact type: *NC = normally closed;*
NO = normally open.

Inputs: *PNP = positive (12-24 V);*
NPN / Push-Pull = negative (12-24 V)

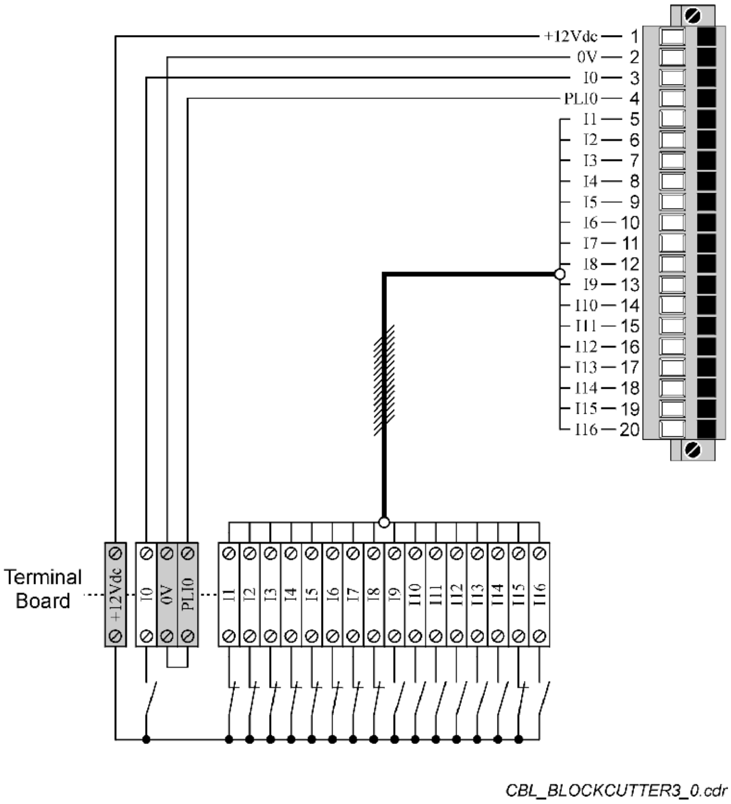
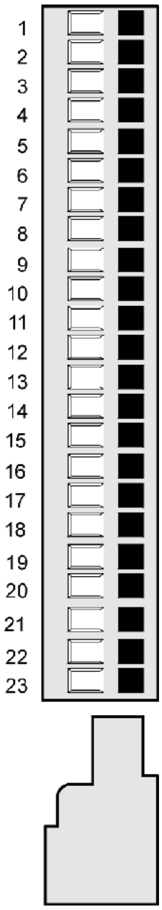


Fig. 5: Wiring example Slot 3: L3-I17 card

3.2 Slot 4: H3-RV2 card



Clip	Name	Logic activ. state	Contact	Description	
1	G AO	-	-	Common AO 1 ÷ AO 2	
2	AO 1	-	-	X, Y	Analogic reference axis speed
3	AO 2	-	-	Z	
4	-	-	-	-	
5	COM 1	-	-	Common O1 ÷ O8	
6	O1	ON	NO	Y	Axis enable
		OFF	NO	X	
7	O2	ON	NO	Automatic cycle	
8	O3	OFF	NC	Allarm Stop *(pag. 36)*	
9	O4	ON / OFF	NO	Out lubrication	
10	O5	ON	NO	End program	
11	O6	ON / OFF	NO	Out alarm *(pag. 36)*	
12	O7	ON	NO	Forward	X/Y
13	O8	ON	NO	Backward	
14	COM 2	-	-	Common O9 ÷ O16	
15	O9	ON	NO	Fall	Z
16	O10	ON	NO	Rise	
17	O11	ON	NO	X	Axis movement
18	O12	ON	NO	Y	
19	O13	ON	NO	Z	
20	O14	ON	NO	Out unloader	
21	O15	ON	NO	Copying *(pag. 31)*	
22	O16	ON	NO	Slow command X, Y axis	
23	COM 2	-	-	Common O9 ÷ O16	

***AO x**: analogical outputs*
***G AO**: common analogical outputs*
***Ox**: digital outputs*
***COM x**: common digital outputs*

Logic activation state: *ON = activated on close contact;*
OFF = activated on a open contact.

Contact type: *NC = normally closed;*
NO = normally open.

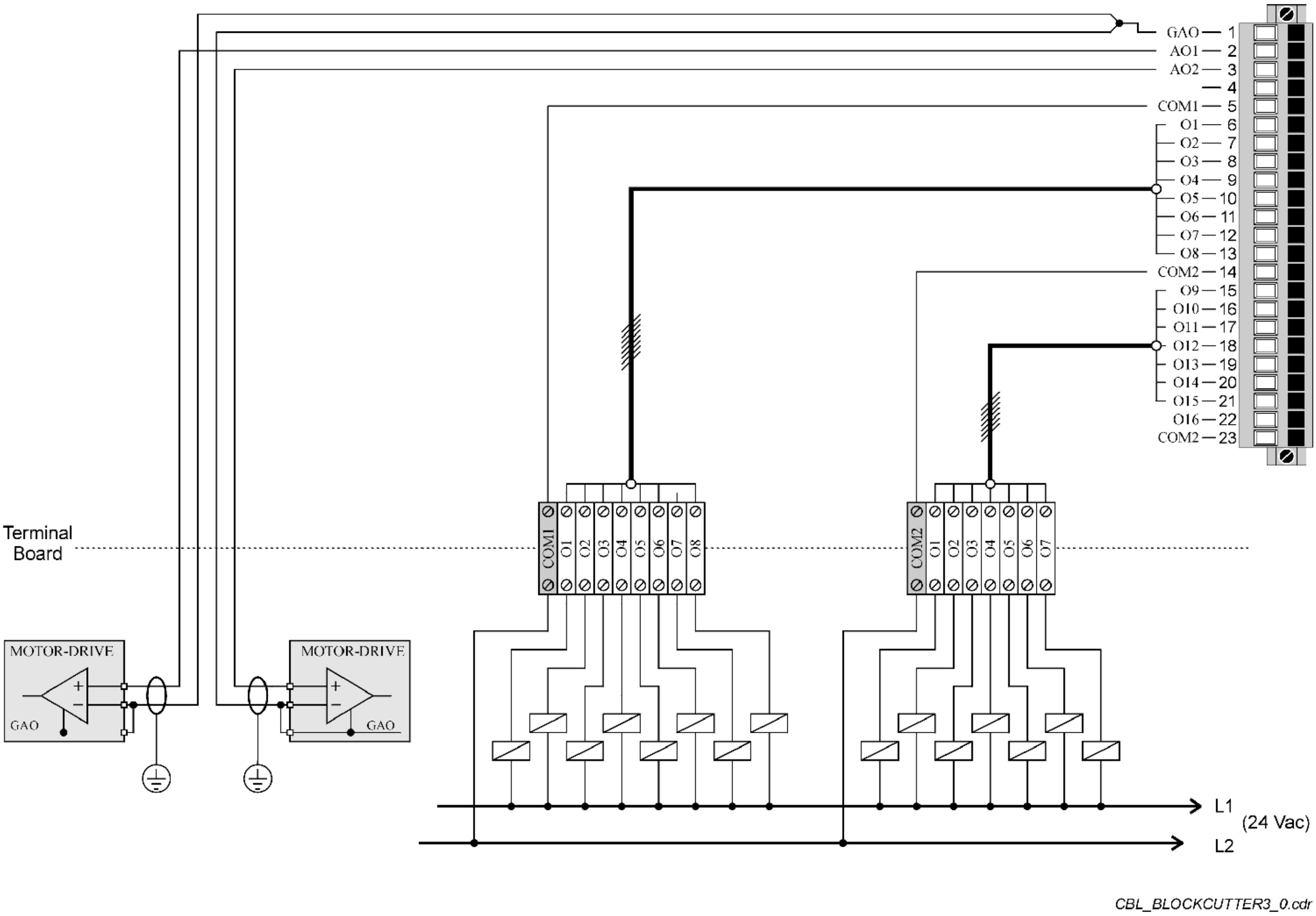
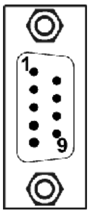


Fig. 6: Wiring example Slot 4: H3-RV2 card

3.3 CNT1



Clip	Name	Description
1	-	-
2	-	-
3	-	-
4	+ 12 Vdc	Out 12 Vdc
5	SCH	Shield
6	PHA	Encoder X / Y
7	PHB	
8	PHZ	
9	0 V	

***SCH**:* *shield*
***PHA**:* *Phase A encoder*
***PHB**:* *Phase B encoder*
***PHZ**:* *Z encoder*

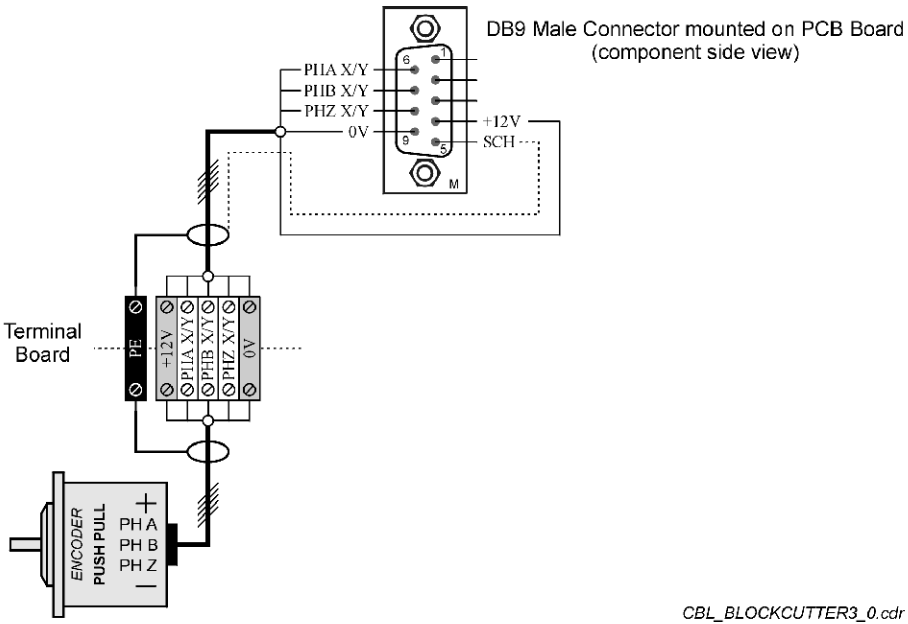
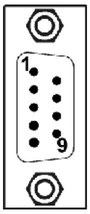


Fig. 7: Wiring example CNT1

3.4 CNT2



Clip	Name	Description
1	-	-
2	-	-
3	-	-
4	+ 12 Vdc	Out 12 Vdc
5	SCH	Shield
6	PHA	Encoder Z
7	PHB	Encoder Z
8	PHZ	Photocell
9	0 V	-

SCH: *shield*
PHA: *encoder Phase A*
PHB: *encoder Phase B*
PHZ: *Z encoder*

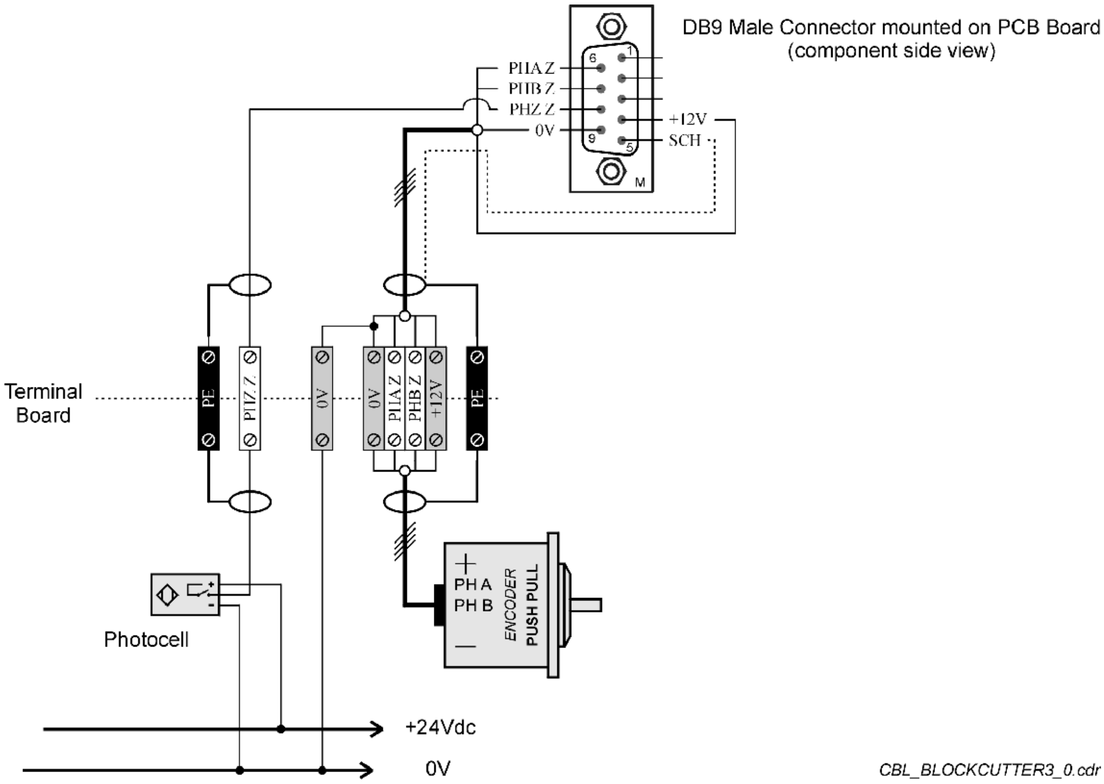
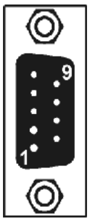


Fig. 8: Wiring example CNT2

3.5 AN INP



Clip	Name	Description	
		Parameter insertion (set up) – Generic Set up - Lim vel. X (pag.19)	
		0	1
1	AI 1	Speed Forward X axis	Speed Forward/Backward X axis
2	G AI	0 V	
3	-	-	
4	G AI	0 V	
5	+ 5 V	OUT 5 V	
		Parameter insertion (set up) – Generic Set up - Lim vel. X (pag.19)	
		0	1
6	AI 2	Speed Backward X axis	Drive blade current
7	G AI	0 V	
8	-	-	
9	-	-	

***AI x**: analogical inputs*
***G AI**: 0V analogical inputs*

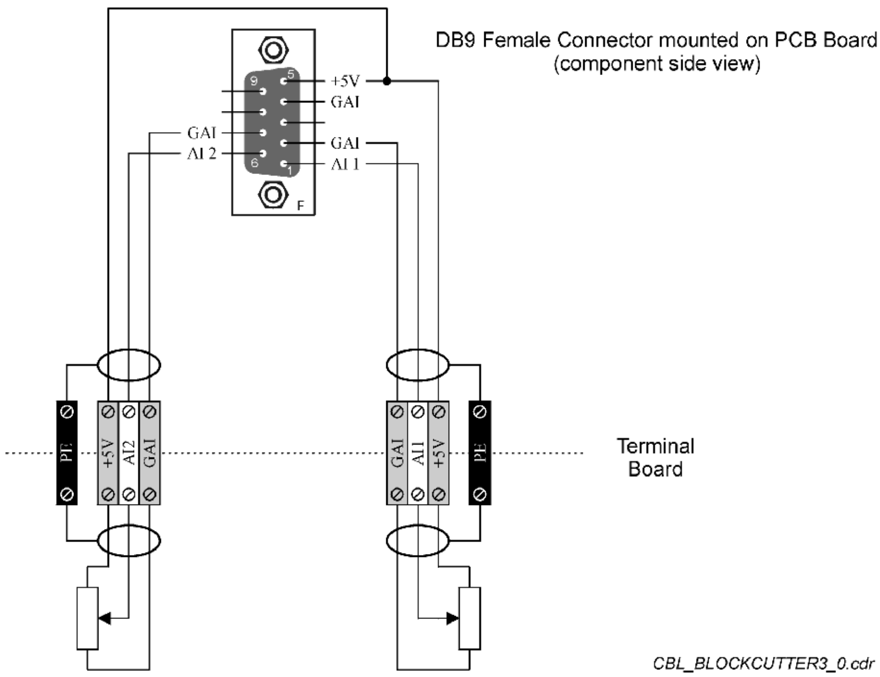


Fig. 9: Wiring example AN INP

4. HMI

4.1 Release message

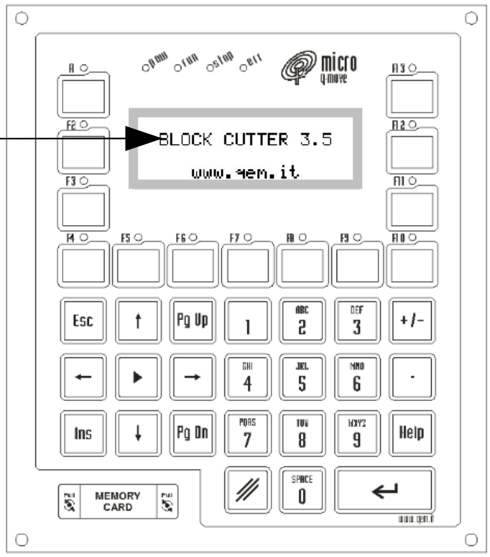


Fig. 10: Release message

4.2 Keyboard

Key	Descriptions
·	Set up axis *(pag. 18)*
Ins	Access data insert
Help	Access to HELP page
F1 (F1)	I/O diagnostics
F5 (F5)	Semiautomatic (led on) Manual (led off)
F6 (F6)	Automatic (led on) Manual (led off)
F7 (F7)	Stop Start
F8 (F8)	Restart
F9 (F9)	Reset axis

4.3 User Led

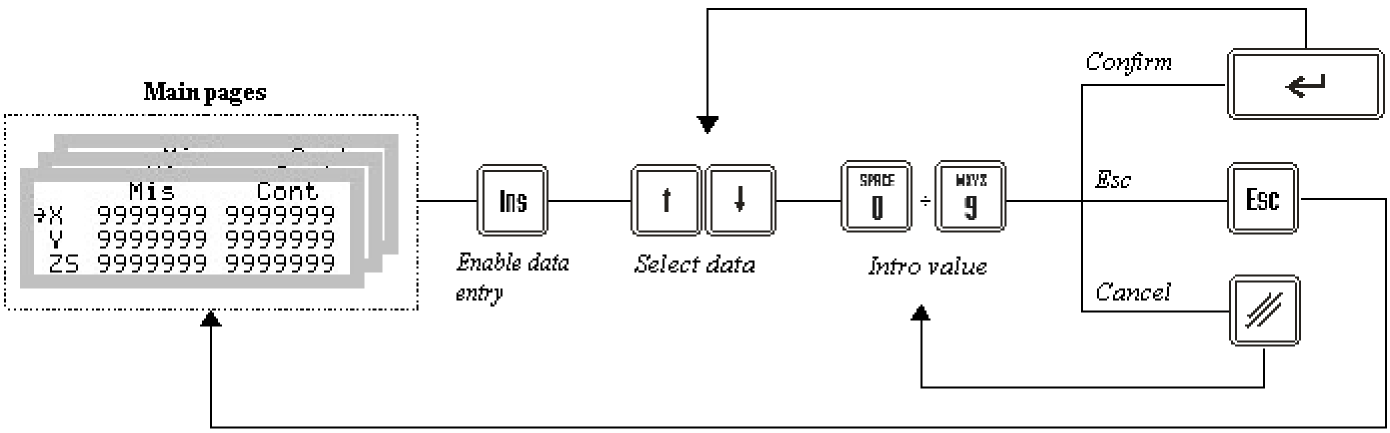
Led	Description
(F5)	Semiautomatic (led on) Manual (led off)
(F6)	Automatic (led on) Manual (led off)
(F7)	Automatic Cycle on (led on)
(F8)	Instrument to RESTART (led on)
(F9)	RESTART done (led on)

4.4 Functions Led

See manual MIM-BASE D983

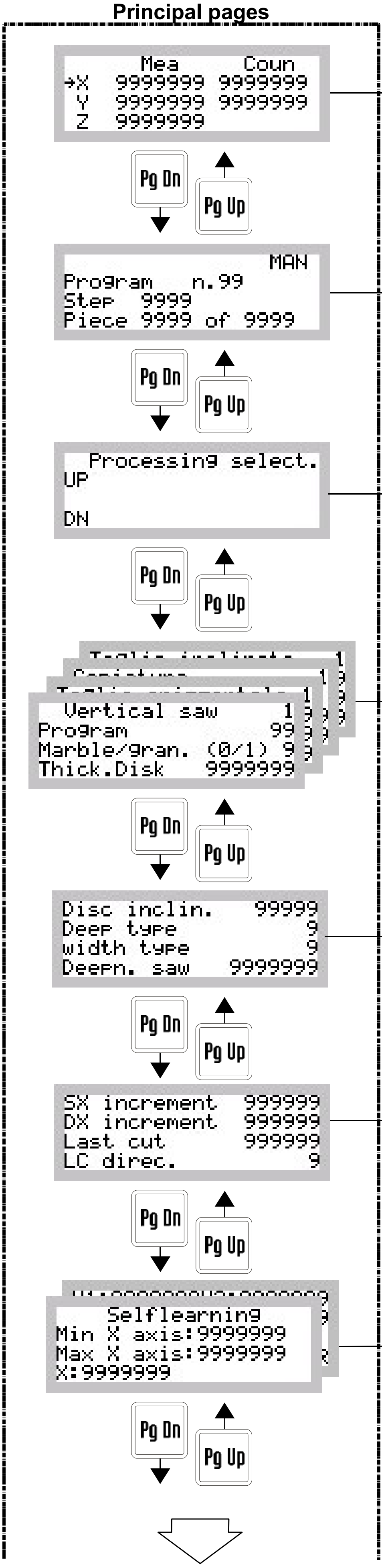
4.5 Insert data

Insert data example.



4.6 General using example

Principal pages



Principal page

Working check
Visualize informations about the working

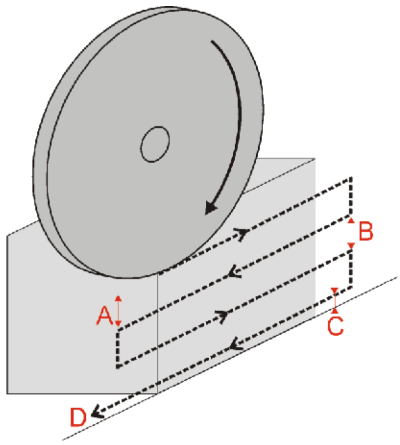
Working choice:
- Vertical cutting;
- Horrizontal cutting;
- Copying;
- Slanting disc cutting ;
- Wire cutting ;
- Multiblock saw
- Square.

Working program

Cutting tool parameters

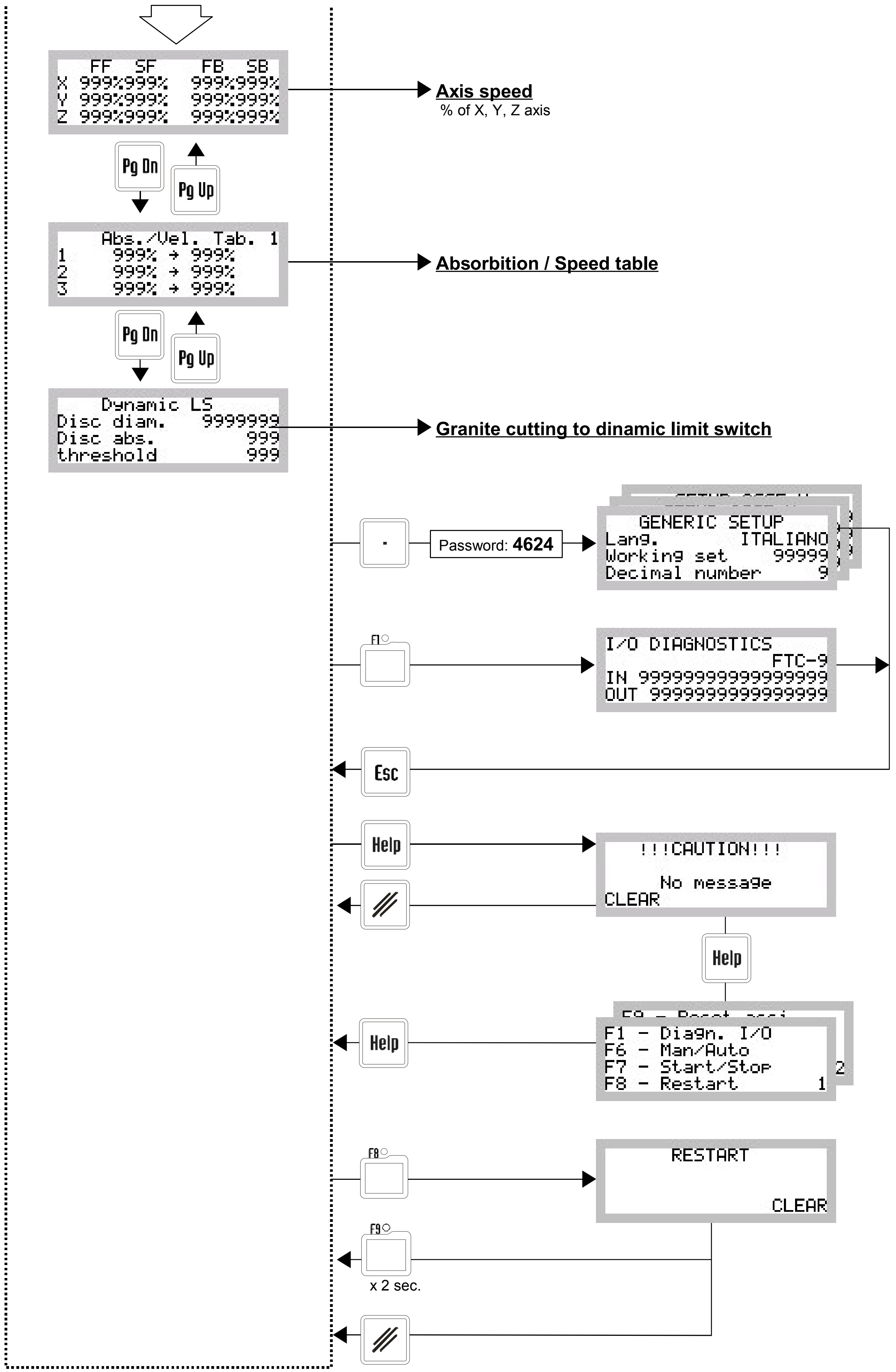
Granite Cutting Specific Parameters

A = Z axe, Sx increase
B = Z axe, Dx increase
C = Last cutting height
D = Last cutting height direction



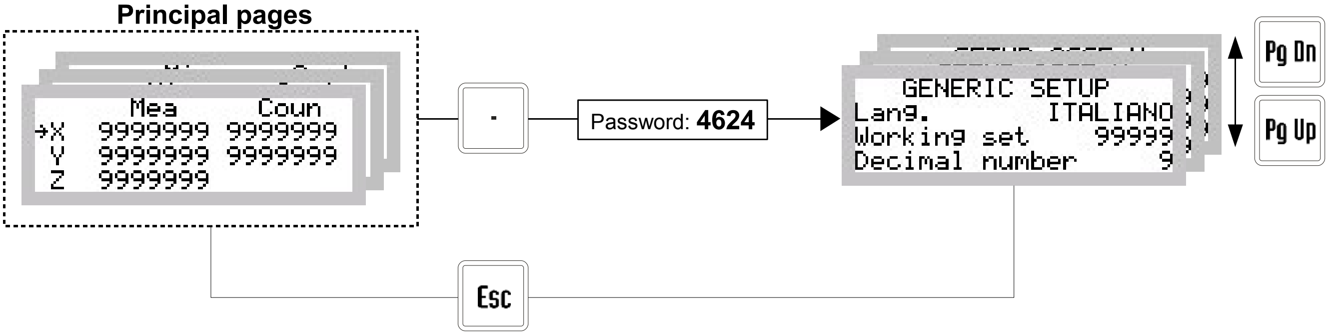
Move the arrow on the axis quota for the self learning

X,Y axis quota self learning
Necessay self learning quotas for automatic workings

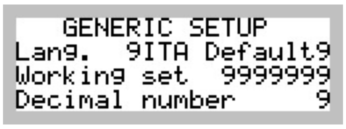

FF SF FB SB
X 999%999% 999%999%
Y 999%999% 999%999%
Z 999%999% 999%999%
Axis speed
% of X, Y, Z axis
Pg Dn
Pg Up
Abs./Vel. Tab. 1
1 999% → 999%
2 999% → 999%
3 999% → 999%
Absorbition / Speed table
Dynamic LS
Disc diam. 9999999
Disc abs. 999
threshold 999
Granite cutting to dinamic limit switch
Password: 4624
GENERIC SETUP
Lang. ITALIANO
Working set 99999
Decimal number 9
F1
I/O DIAGNOSTICS
FTC-9
IN 9999999999999999
OUT 9999999999999999
Esc
Help
!!!CAUTION!!!
No message
CLEAR
F1 - Diagn. I/O
F6 - Man/Auto
F7 - Start/Stop
F8 - Restart
F8
RESTART
CLEAR
F9
x 2 sec.

5. Parameter insertion

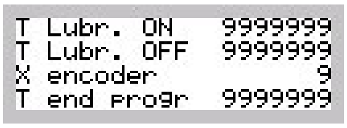
In order to enter in the set-up area:



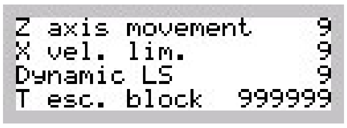
5.1 Generic Set up



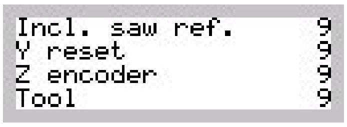
Parameter	Range	Description
Lang.	1,2, 3	**1:** italian, **2:** english, **3:** portuguese.
Default	0 ÷ 1	To restore default data: – set this parameter to 0; – switch off then on the instrument.
Working set	XXXXXX (Es. 1 0 1 0 1 0 1).	**0** = working ok **1** = working off. Working type: - Square - Multiblock saw - Wire cutting - Slanting disc cutting - Copying - Horizontal cutting - Vertical cutting
Decimal number	0÷2	Number of decimal numbers.

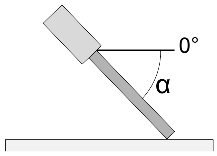
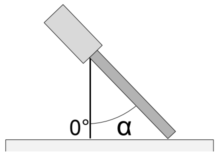


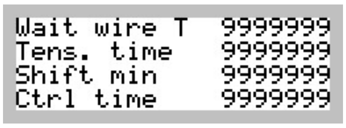
Parameter	Range	Description	
T lubr. ON	0 ÷ 99999.999 (sec.)	Time on	Out lubrication (O4)
T lubr. OFF	0 ÷ 99999.999 (sec.)	Time off	
X encoder	0 ÷ 1	**0:** handled by an encoder **1:** not handled by an encoder	X axis
T end prog	-99999 ÷ 99999	End of program output activation timer (O5) **< 0**: the output remain enabled until a restart **0**: activation for one second **> 0**: activation for a set time	



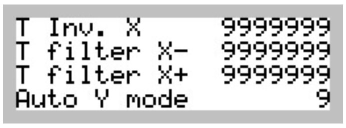
Parameter	Range	Description
Z axis movement	0 ÷ 2	Z and X axis motion during the incremental cutting **0**:X axis moves after the Z axis lowering **1**: X axis moves simultaneously with Z axis lowering **2**: Z axis begins the lowering when X axis enter the slow-down
X vel. Lim.	0 ÷ 1	Automatic limitation X axis speed **0**: Off; **1**: regulation inversely proportional to the disc motor current
Dynamic LS	0 ÷ 1	In order to use this function enable Lim. Vel. X parameter **0**: OFF **1**: ON
T. esc. block	0 ÷ 99,999	Time between blade exit from the block and the next axis movimentation (with Dynamic LS = 1)



Parameter	Range	Description
Incl. Saw ref.	0 ÷ 1	Blade inclination: **0**: Inclination with horizontal reference  **1**: Inclination with vertical reference 
Y reset	0 ÷ 1	Reset Y axis at the end of the semi-automatic movement **0**: OFF **1**: ON
Z encoder	0 ÷ 2	**0:** Z axis management to encoder. **1:** Z axis management to time (with parameters “Spazio 1s Z”). **2:** Z axis management to limit witch.
Tool	0 ÷ 1	**0:** DISC tool **1:** WIRE tool



Parameter	Range	Description
Wait wire T	0 ÷ 999.999 (sec.)	Axis stop time between two movements in “Wire cutting “
Tens. time	0 ÷ 999.999 (sec.)	Axis stop time for "low wire tension"
Shift Min,	0 ÷ 9999999 (Um)	Minimum movement value to do in "TCtrl" for the encoder breaking check
Ctrl time	0 ÷ 9999999 (ms)	Time to execute the minimum movement "Min mov." for the encoder breaking check



Parameter	Range	Description
T Inv X	0 ÷ 999.999 (sec.)	Timer with no LS control after X axis movement inversion.
T filter X-	0 ÷ 999.999 (sec.)	Filter time for X axis backward LS (I2)
T filter X+	0 ÷ 999.999 (sec.)	Filter time for X axis forward LS (I1)
Auto Y mode	0 ÷ 1	Reset Y axis at the end of the automatic movement **0**: OFF **1**: ON

5.2 Set up Cutting speed modulation



Parameter	Range	Description	
ES I of TA	0 ÷ 999.99	Max power data	
ES V of TA	0 ÷ 999.99	Max voltage data	Transformer Ammeter
SS V of TA	0 ÷ 999.99	Min voltage data	



Parameter	Range	Description
CNMD	0 ÷ 999.99	Motor disc nominal power
NPC	1 ÷ 9	Number of turn twisted on Transformer Ammeter
RC time	0 ÷ 32767 (tipico 150 ms)	Higher is this value bigger is the filter on the reading the disc current (AI 2)

5.3 Z axis Set up

```
    Z AXIS SETUP
Res.measureZ 9999999
Res. pulseZ  9999999
Slow      Z  9999999
```

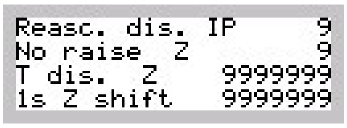
Parameter	Range	Description
Z resolution	1 ÷ 999999	**MEASURE**. It indicates the axis covered space to obtain the set encoder impulses in the Pulse parameter.
	1 ÷ 999999	**PULSE**. It indicates the encoder impulses (x 4 times) to obtain the set space in the Measure parameter.
Slow Z	0 ÷ 9999 (Um)	Slow-down axis space.

```
T slow    Z  9999999
Inertia mode Z     9
Forw.iner.Z  9999999
Back.iner.Z  9999999
```

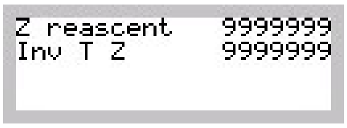
<table>
<tr><th>Parameter</th><th>Range</th><th colspan="2">Description</th></tr>
<tr><td>T slow Z</td><td>0 ÷ 999 (ms)</td><td colspan="2">Deactivation motion outputs time at the speed changing. To command the axis with teleruptors, set 50 this parameter, if not set zero.</td></tr>
<tr><td>Inertia mode Z</td><td>0,1</td><td colspan="2">Validate inertia recalculation
0: OFF
1: ON</td></tr>
<tr><td>Forw. iner. Z</td><td>0 ÷ 9999 (Um)</td><td>Forward inertia</td><td rowspan="2">Z axis</td></tr>
<tr><td>Back iner. Z</td><td>0 ÷ 9999 (Um)</td><td>Backward inertia</td></tr>
</table>

```
Overpos.Z    9999999
Z toler.     9999999
Z max.tol.   9999999
Back lash mode Z   9
```

Parameter	Range	Description
Oltrpos. Z	0 ÷ 9999 (Um)	If "recovering play clearance" is not zero, the axis continues his movement over target-quota for a value equal to the set value. It inverts the movements and positions on a target quota.
Z toler.	± 999.9 (Um)	Space within the axis is in tolerance. Out of this space an alarm is not generated
Z max. tol.	± 999.9 (Um)	Space within the axis is in tolerance. Out of this space an alarm is not generated
Back lash mode Z	0, 1, 2	**0**: without recovery play, **1**: Forward recovery play, **2**: Backward recovery play.

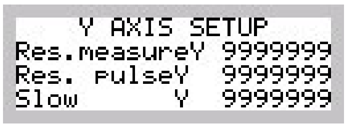


Parameter	Range	Description
Reasc. Dis. IP	0 ÷ 1	Disable the axis rising at the beginning of the working **0**: re-rise to “0” **1**: not re-rise to “0”
No raise Z	0 ÷ 1	Disable the axis rising at the end of the working **0**: re-rise to “0” **1**: not re-rise to “0”
T dis. Z	0 ÷ 9999 (sec.)	Time between axis stop and motion outputs deactivation and position transducer reading
1s Z shift	0 ÷ 999999 (Um)	Space covered in a second It is used when "Encoder Z"=1 It allows to estimate the activation time of the last "Lowering Z axis" (O9)

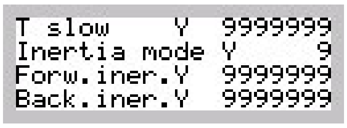


Parameter	Range	Description
Z reascent	0 ÷ 999999 (Um)	Rising space Z axis after the marble cutting and before the Y axis movement.
Inv T Z	0 ÷ 9999.99	Minimum time between Z axis movement in a direction and the next in the opposite direction.

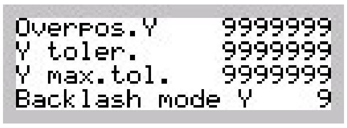
5.4 Y axis Set up



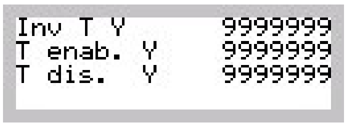
Parameter	Range	Description
Y resolution	1 ÷ 999999	**MEASURE**. It indicates the axis covered space to obtain the set encoder impulses in the Pulse parameter.
	1 ÷ 999999	**PULSE**. It indicates the encoder impulses (x 4 times) to obtain the set space in the Measure parameter.
Slow Y	0 ÷ 9999 (Um)	Slow-down axis space.



Parameter	Range	Description	
T slow Y	0 ÷ 999 (ms)	Deactivation motion outputs time at the speed changing. To command the axis with teleruptors, set 50 this parameter, if not set zero.	
Inertia mode Y	0,1	Validate inertia recalculation **0**: OFF **1**: ON	
Forw. Iner. Y	0 ÷ 9999 (Um)	Forward inertia	Y axis
Back iner. Y	0 ÷ 9999 (Um)	Backward inertia	



Parameter	Range	Description
Overpos. Y	0 ÷ 9999 (Um)	If "recovering play clearance" is not zero, the axis continues his movement over target-quota for a value equal to the set value. It inverts the movements and positions on a target quota.
Y toler.	± 999.9 (Um)	Space within the axis is in tolerance. Out of this space an alarm is not generated
Y max. tol.	± 999.9 (Um)	Space within the axis is in tolerance. Out of this space an alarm is not generated
Blacklash mode Y	0, 1, 2	**0**: without recovery play, **1**: Forward recovery play, **2**: Backward recovery play.



Parameter	Range	Description
Inv T Y	0 ÷ 999.99 (sec.)	Minimum time between Y axis movement in a direction and the next in the opposite direction.
T enab. Y	0 ÷ 9999 (ms)	Time between axis enable and motion outputs are on and position transducer reading.
T dis. Y	0 ÷ 9999 (ms)	Time between axis stop and motion outputs deactivation and position transducer reading

5.5 Set up axis X

```
    SETUP ASSE X
Ris.measureX 9999999
Ris. pulseX  9999999
Rallentam.X  9999999
```

Parameter	Range	Description
X resolution	1 ÷ 999999	**MEASURE**. It indicates the axis covered space to obtain the set encoder impulses in the Pulse parameter.
	1 ÷ 999999	**PULSE**. It indicates the encoder impulses (x 4 times) to obtain the set space in the Measure parameter.
X slow-down	0 ÷ 9999 (Um)	Slow-down axis space.

```
T slow     X  9999999
Inertia mode X      9
Forw.iner.X   9999999
Back.iner.X   9999999
```

Parameter	Range	Description	
T slow X	0 ÷ 999 (ms)	Deactivation motion outputs time at the speed changing. To command the axis with teleruptors, set 50 this parameter, if not set zero.	
Inertia mode X	0,1	Validate inertia recalculation **0**: OFF **1**: ON	
Forw. Iner. X	0 ÷ 9999 (Um)	Forward inertia	Xaxis
Back. iners. X	0 ÷ 9999 (Um)	Backward inertia	

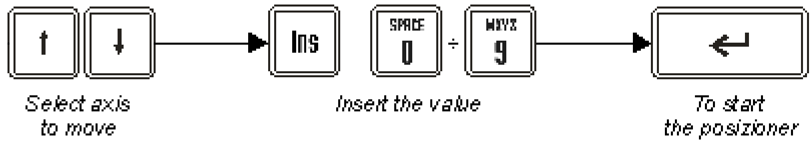
```
MovMan X            9
X toler.      9999999
T enab. X     9999999
T dis.  X     9999999
```

Parameter	Range	Description
MovMan X	0 ÷ 1	X axis manual moviment. **0**: start on the advancing face and stop on the JOG inputs retreating face **1**: Start on the advancing face and stop on the next advancing JOG input (SET/RESET) If this parameter is =1 it will be set a 500ms timer to avoid the axis starting
X tiler.	± 999.9 (Um)	Space within the axis is in tolerance. Out of this space an alarm is not generated
T enab. X	0 ÷ 9999 (ms)	Time between axis enable and motion outputs are on and position transducer reading.
T dis. X	0 ÷ 9999 (ms)	Time between axis stop and motion outputs deactivation and position transducer reading

6. Functioning

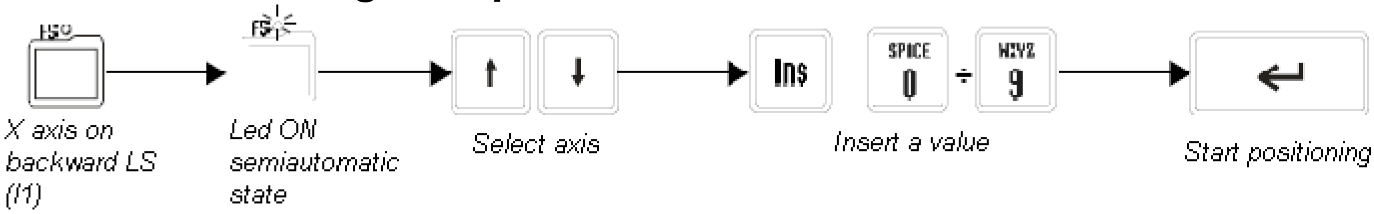
6.1 Immediate positioning to a quota.

Quota insertion for immediate positioning



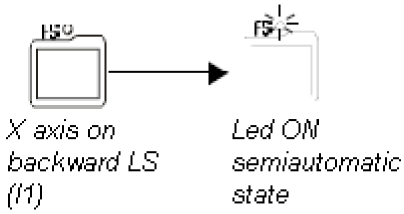
6.2 Semiautomatic

6.2.1 Positioning to a quota and cut



At the end of the positioning, cut starts. X axis move on the forward LS (I1), then come back to backward LS (I2).

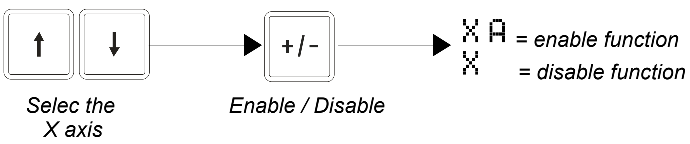
6.2.2 Single cut



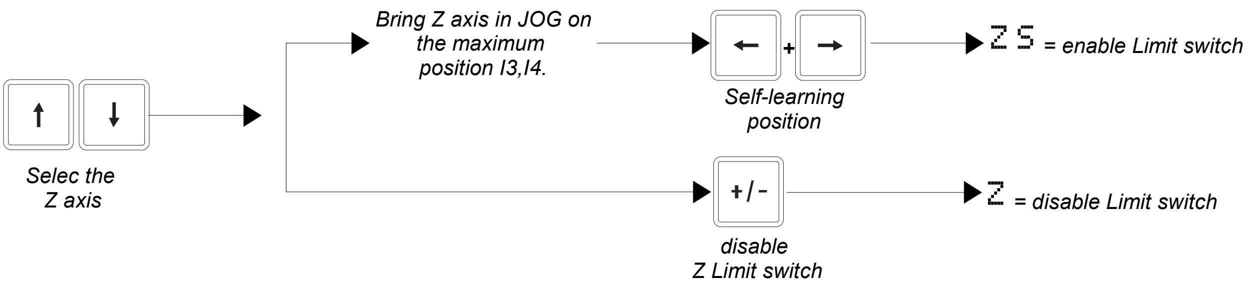
On activating I9 (Jog forward X) a single cut starts.

6.3 JOG stop on the self learnt quota

To enable or to disable virtual limit switches follow the instructions:



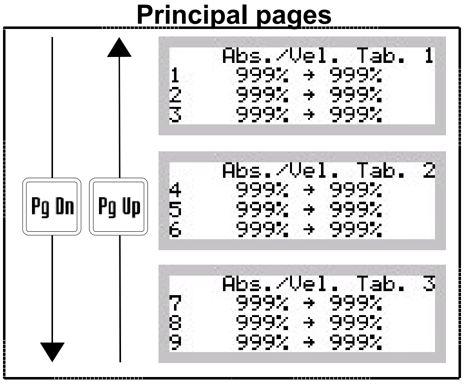
6.4 Maximum limit switch self learning of the Z axis

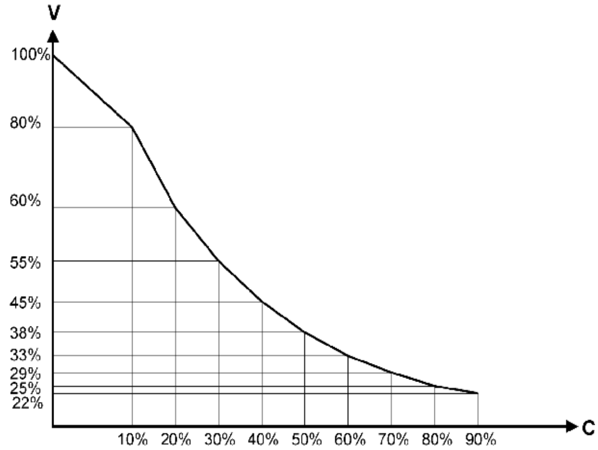


6.5 Cutting speed regulation in function of the disc.

Setting table fort cutting speed (% data) in function of the disc motor current (% data).

Principal pages



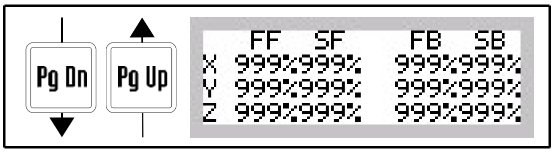


Enable to Set up “Lim. Vel X = 1” (pag. 19)
Insert the value on Set up “Limit cutting speed” (pag. 20)

6.6 Limit switch (Granite cutting)

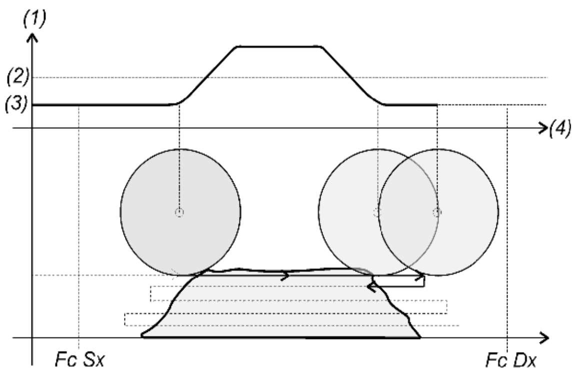
The dynamic limit switches are virtual limit switches that the instrument calculate in function of the disc motor current. When the blade exits from the block, the current decreases, in that moment will be added a space before execute a lowering movement of the Z axis and then reversing the X axis in order to have another cut.
The calculation is done respecting cutting parameters:

Principal pages



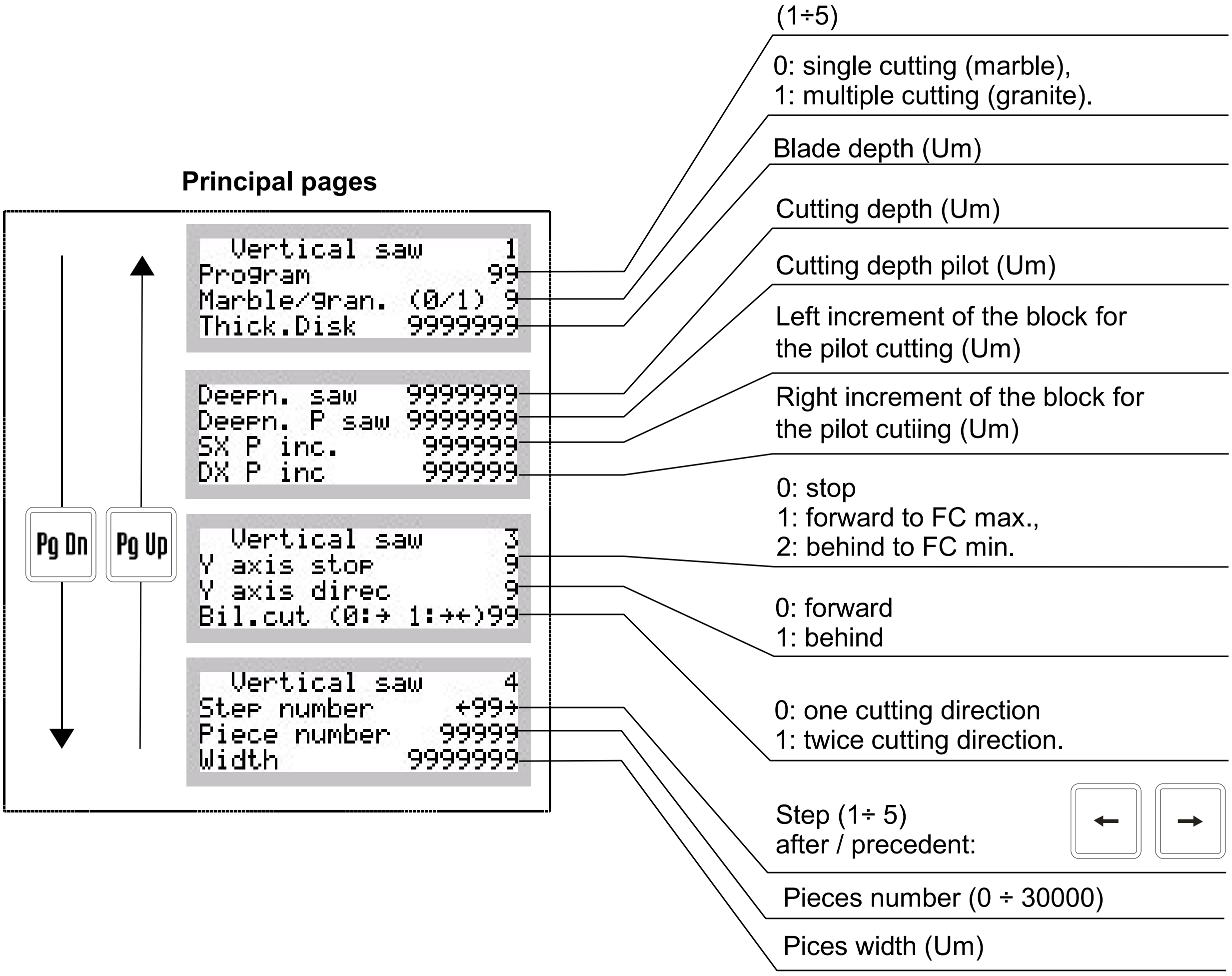
*To enable dynamic limit switches it is necessary to set to 1 parameters "Kim. speed X" and "Dynamic Limit switches". (see on **Generic set up** pag.18).*

(1) Driving absorption
(2) Control line
(3) Vacuum absorption
(4) length cutting



6.7 Choice and program working

6.7.1 Vertical cutting



At the end of each cut, it is activated OUT unloader (O14) that will be activated until the intervention of the Unloader out of the working area input (I15).

Limit switches positions self-learning, before X axis working starting

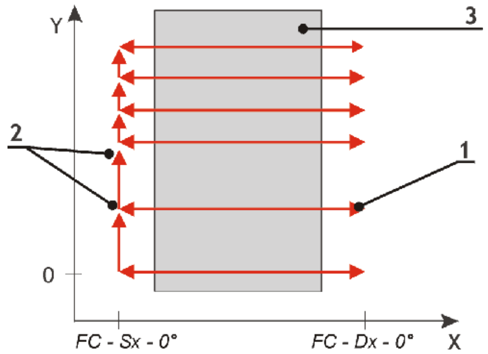
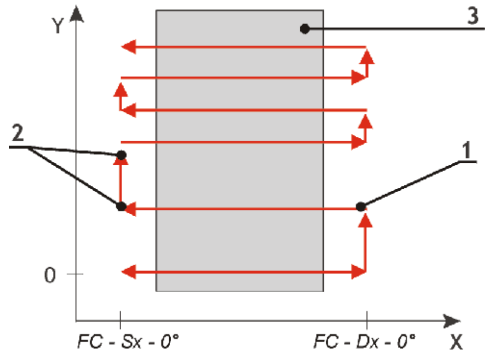
In order to insert the end of program, digit "pieces number = 0"

Before the starting, the X axis has to be on the left of the block (in is necessary that the minimum limit switch is pushed)

In order to disable the pilot cutting, it is necessary put to 0 the "pilot cutting depth" parameter.

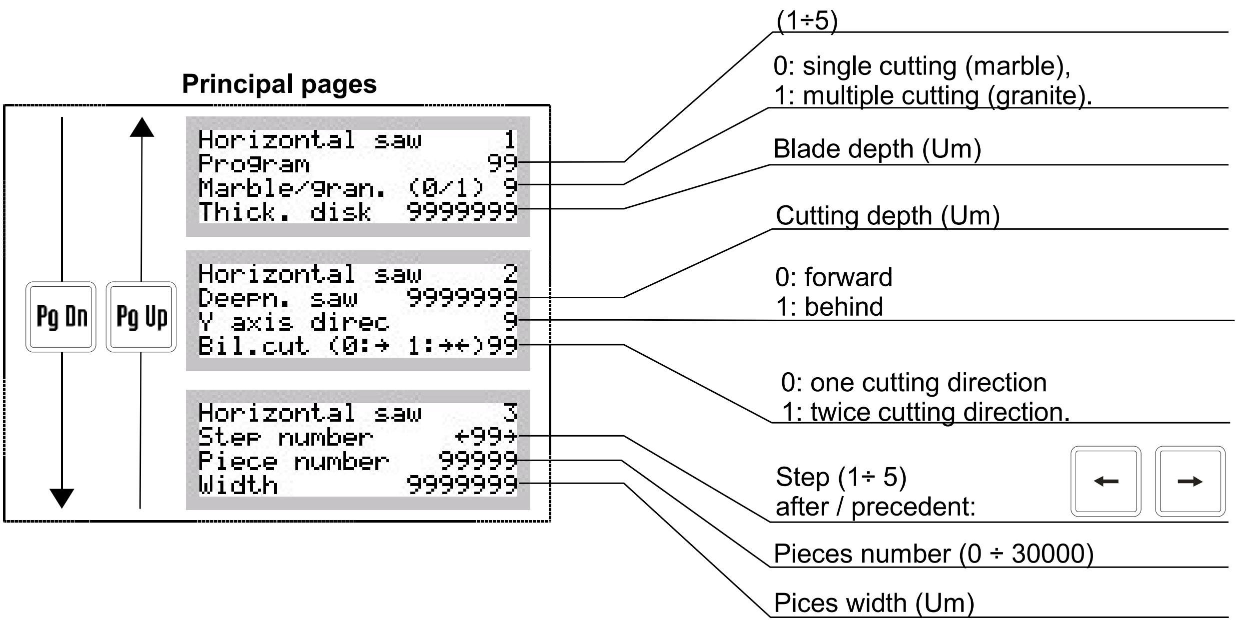
6.7.1.1 Example

Vertical cutting			
Step number	***1***	***2***	***3***
Pieces number	*2*	*3*	*0*
Width	*20.0mm*	*8.0mm*	*0*

Disk Trajectory Tag. Bil. (0:→ 1:→←)	
0	1
	

1 = Going/Return blade
2 = Cutting width
3 = Marble / Granite

6.7.2 Horizontal cutting



At the end of each cut, it is activated OUT unloader (O14) that will be activated until the intervention of the Unloader out of the working area input (I15).

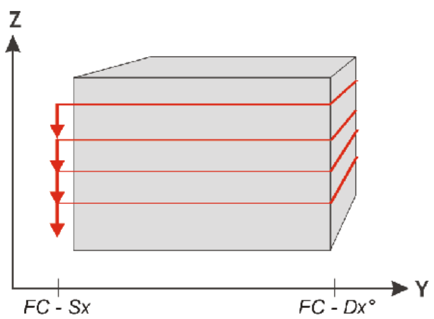
Limit switches positions self-learning, before X axis working starting

In order to insert the end of program, digit "pieces number = 0"

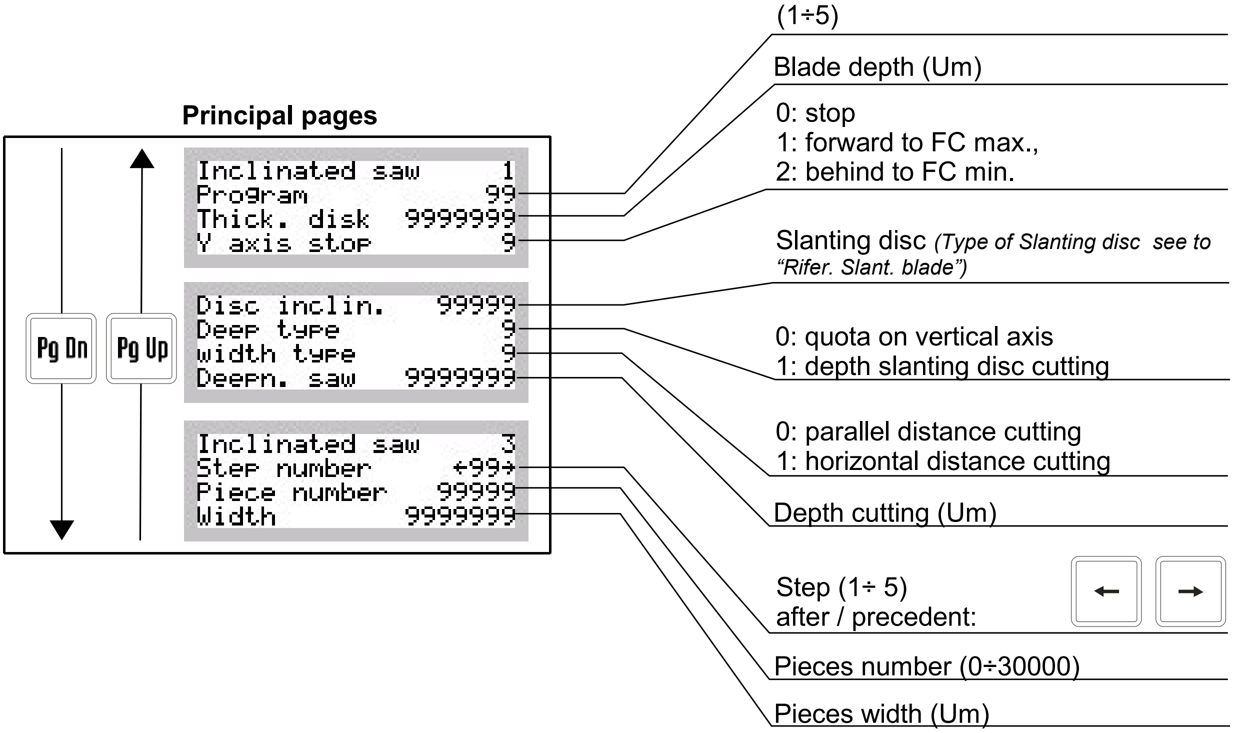
Before the starting, the X axis has to be on the left of the block (in is necessary that the minimum limit switch is pushed)

6.7.2.1 Example

Horizontal cutting		
Step number	***1***	***2***
Pieces number	*3*	*0*
Width	*20.0mm*	*0*



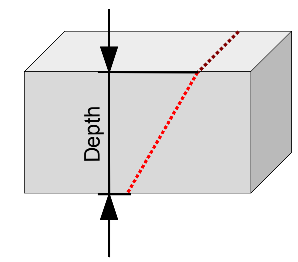
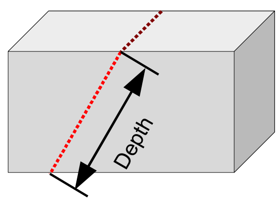
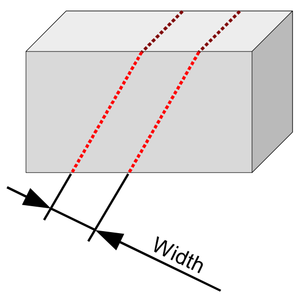
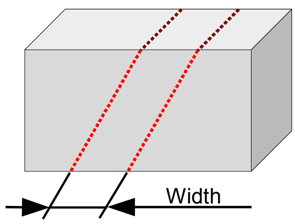
6.7.3 Slanting disc cutting



Limit switches positions self-learning, before X axis working starting

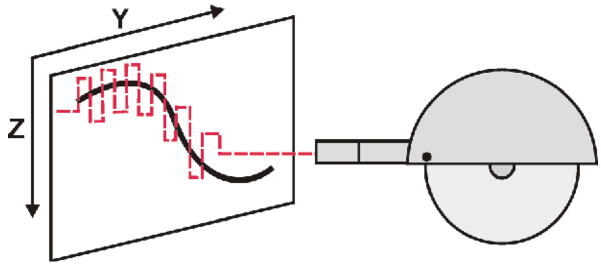
In order to insert the end of program, digit "pieces number = 0"

Before the starting, the X axis has to be on the left of the block (in is necessary that the minimum limit switch is pushed)

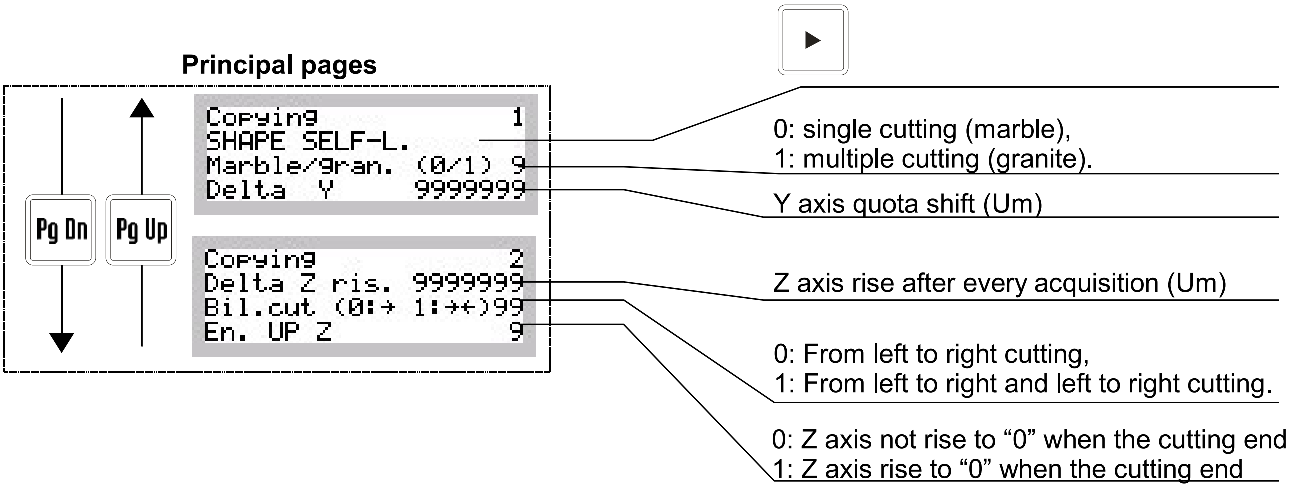
Depth type		Thickness type	
0	1	0	1
			

6.7.4 Shape acquisition (Copying)

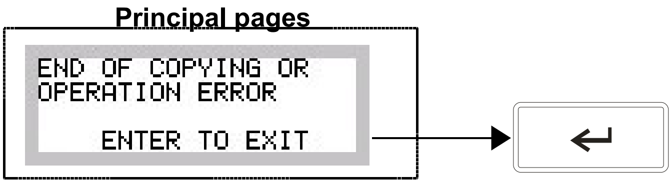
This procedure allows to acquire a shape with a photocell installed on the Z axis.



Principal pages



At the end of the acquisition, quotas are normalized to a minimum zero value and all the other values positive. The display visualize:



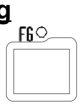
Conditions of correct acquiring ending	Conditions of not correct acquiring ending
-Z axis limit switch occupation during the descent - STOP command and RESTART after	- Y axis limit switch occupation during to forwarding - 1000 points are end.

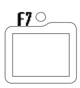
6.7.4.1 Shape self-learning (COPY)

Preparation

1) Set copying parameters;
2) Put X axis on out obstruction;
3) Position the photocell up on the shape;

Executing

4) Pull 

(Led ON = automatic) and after START 

;
5) The Z axis goes down moving the photocell downward;
6) The photocell intercepting the shape;
7) Acquisition counter to shape survey;
8) Stand out than Z axis and "Delta Z ris." quota;
9) Y axis shift of to "Delta Y";
10) If the photocell is: ON =The Z axis goes up until the photocell OFF, restart to point n. 5;
OFF = restart to point n. 5.

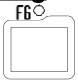
6.7.1.1 Executing (CUT)

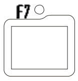
In order to start the working the operator has to reset the Z axis on the block upper face and put in in execution the self learned

Preparation

1) Put, on manual mode, X axis to Left of bloc;

Executing

2) Pull 

(Led ON = automatic) and after 

;
3) The Z axis goes to the sample depth (or executes the passes cutting up to the sample depth);
4) Execute the cutting to the acquired quota;
5) Stand out than Z axis to “0” if “En. ris. Z” = 1 (pag. 31);
6) Y axis shift;
7) Cycle repetition to point n.3.

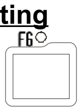
6.7.1.1 Immediate cut (COPY & CUT)

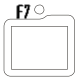
In order to start the working the operator has to reset the Z axis on the block upper face and put in in execution the self learned

Preparation

1) Put, on manual mode, X axis to Left of bloc;

Executing

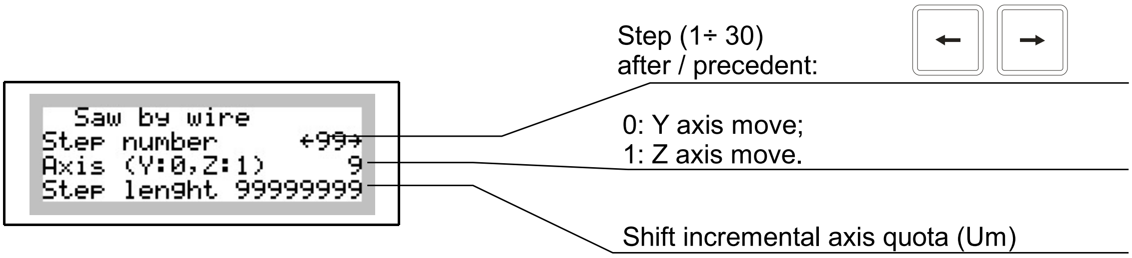
2) Pull 

(Led ON = automatic) and after 

;
3) The Z axis goes down moving the photocell downward;
4) The photocell intercepting the shape;
5) Acquisition counter to shape survey and STOP to Z axis;
6) Re-positioning Z axis on the acquired quota;
7) Execute the cutting;
8) Stand out than Z axis to “0” if “En. ris. Z” = 1 (pag. 31);
9) Y axis shift;
10) Cycle repetition to point n.3.

6.7.1 Wire cutting

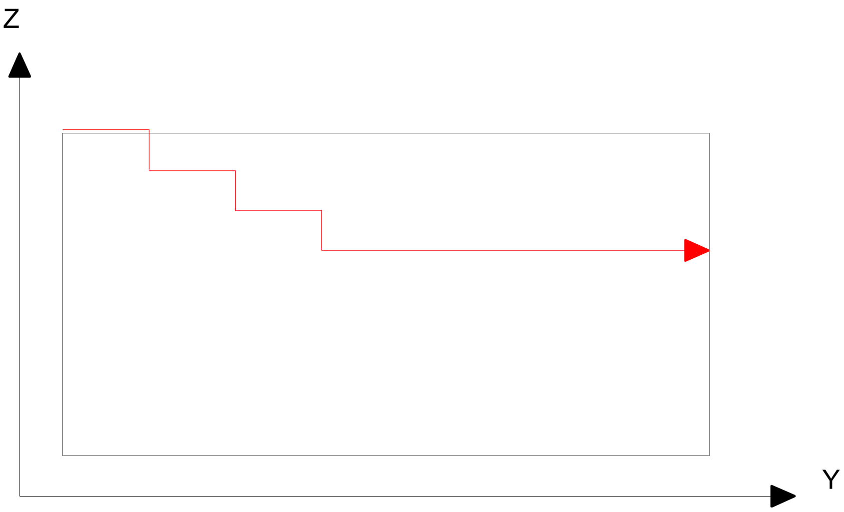
The parameter “Tool” must be 1.



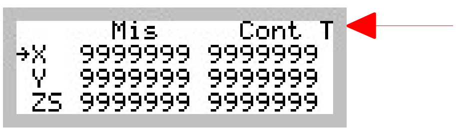
To end program digit “ Steo lenght = 0”.

6.7.1.1 Example

Wire cutting								
Step number	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***
Axis	*0*	*1*	*0*	*1*	*0*	*1*	*0*	*0*
Step Length	*40.0mm*	*20.0mm*	*40.0mm*	*20.0mm*	*40.0mm*	*20.0mm*	*180.0mm*	*0*



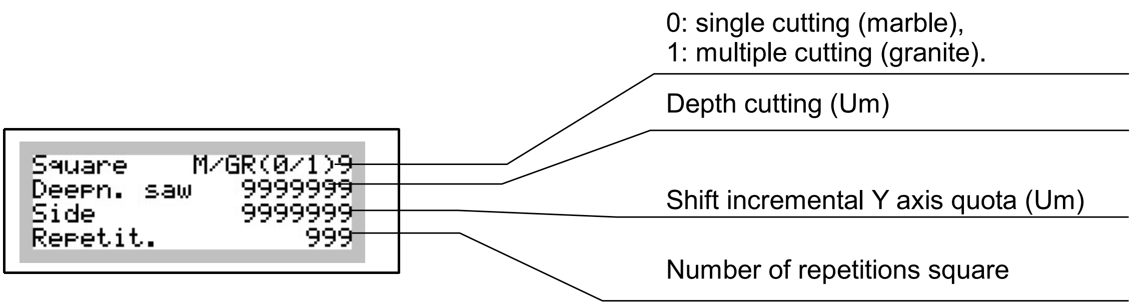
If the wire is under a least tension for the block working (I0 = 0) the axis positioning or the automatic cycle starting is blocked and appears the signal on the main visualization:



The working re-starts automatically after setup timer expiration "T in Tens" from the re-activation of the I0 input.

6.7.2 Square

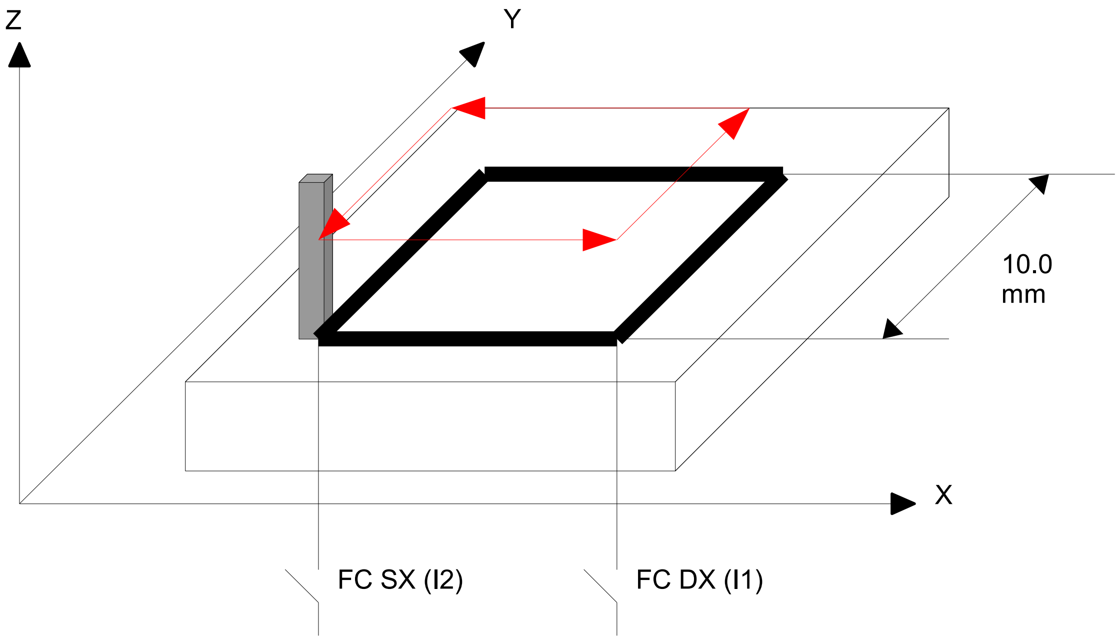
This working allows to execute a four-sided figure in the XY plane between the two LS of the X axis and an incremental quota of the Y axis.



If the "Deepn. saw" parameter = 0, the automatic cycle, in the marble working, doesn't execute the axis moving to the program beginning.

6.7.2.1 Example

Square	
Deepn. saw	50.0 mm
Side	10.0 mm
Repetitions	10



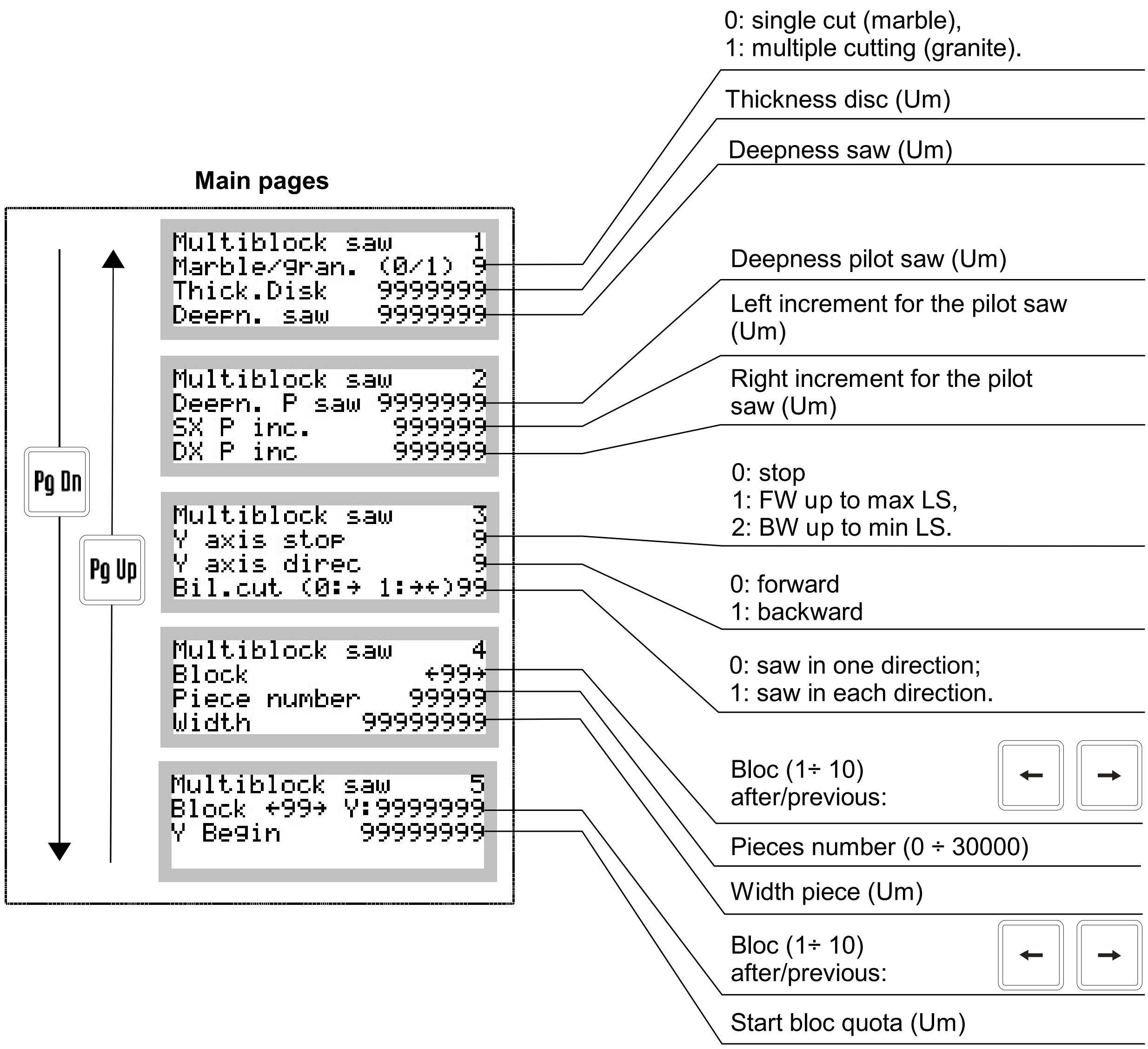
If M/GR(0/1) = 0:
- The Z axis goes down to the 50.0 mm quota or up to the limit switch (I5);
- the X and Y axis perform so many squares how many the repetitions are "Repetition"

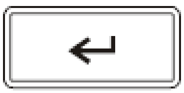
If M/GR(0/1) = 1:
- the X and Y axis execute a first square with a 0 depth;
- The Z axis executes a movement equal to the incremental left pass cutting and subsequently the X and the Y execute a square;
- The cycle is repeated up the 50.0 mm quota or up to the limit switch (I5).

The working starting to the right limit switch of X axis (I2).

6.7.3 Multiblock saw

This working allows to execute multiple cutting programs on a max of 10 blocs.



It's possible to self-learn the START BLOC QUOTA by pressing 

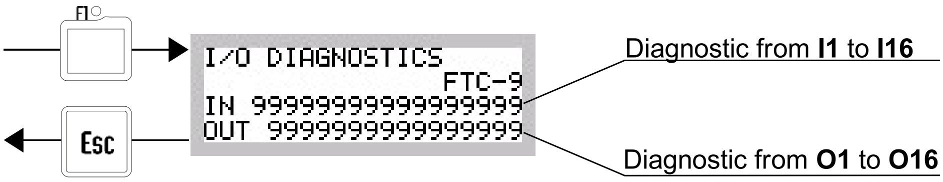
Limit switches positions self-learning, before X axis working starting

To end program insert " Piece number = 0".

The working starting to the right limit switch of X axis (I2)

To disable Pilot Saw insert 0 in the "Deepness pilot saw" parameter.

6.8 I/O diagnostics



6.9 Alarms

Message		Motive	Solution
End copy /Copy error	⚠	- End memory - Y axis on max limit switch. - Y axis on max limit switch.	- Upper the step of limit switches in use. - Check the limit switch;
Cutting on max limit switch	⚠	I1 = off on automatic cycle	Check the quota digit , transducer and connections.
Cutting on min limit switch	⚠	I2 = off on automatic cycle	
Bridge axis out of tolerance.	⚠	Y axis out of tolerance.	Check lock sistem and positioner speed is high.
Disc out of tolerance.	⚠	Z axis out of tolerance.	
FC Y forward	STOP	I3 = off on automatic cycle	Check the quota digit , transducer and connections.
FC Y behind	STOP	I4 = off on automatic cycle	
FC Z forward	STOP	I5 = off on automatic cycle	
FC Z behind	STOP	I6 = off on automatic cycle	
FC X fault	STOP	I1 = off I2 = off	Check the limit switch and connections.
Emergency	STOP	I8 = off	Check the emergency button, and emergency line connections.
No automatic consent	STOP	I7 = off on automatic cycle	Check the connections.
Breaking of X axis encoder	STOP	Are not detected at least 10 impulsed in 2 seconds of motion	There is a possible problem in the impulse detection or in the motion activation.
Breaking of Y axis encoder	STOP		
Breaking of Z axis encoder	STOP		

⚠ = The machine is not lock: O6 (out alarm) = slow lightning.

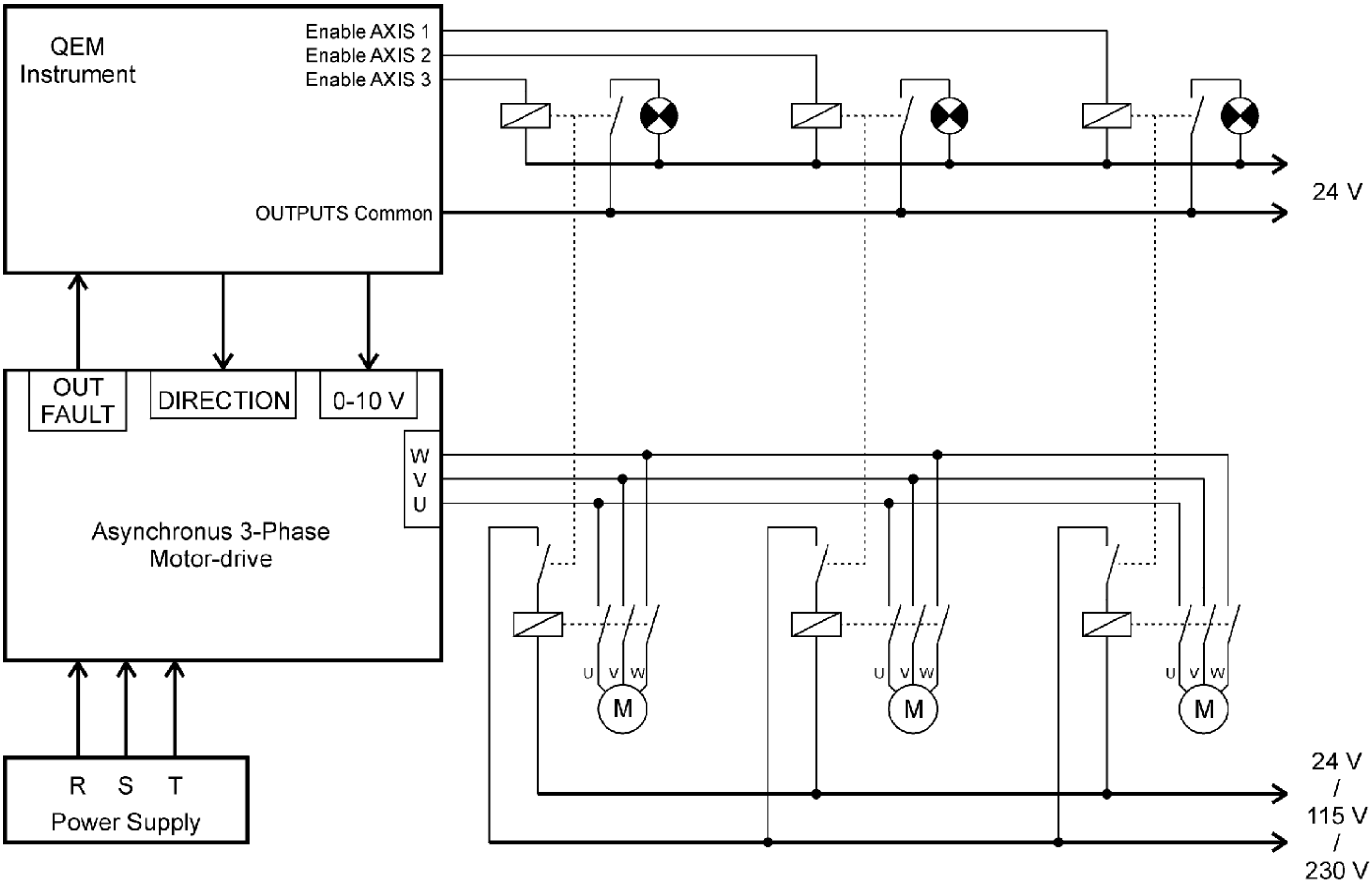
STOP = The machine is lock: O3 (Stop for alarm) = OFF,
O6 (Out alarm) = rapid lightning.

7. Appendix

7.1 Functioning examples

7.1.1 Multiplexer system diagram

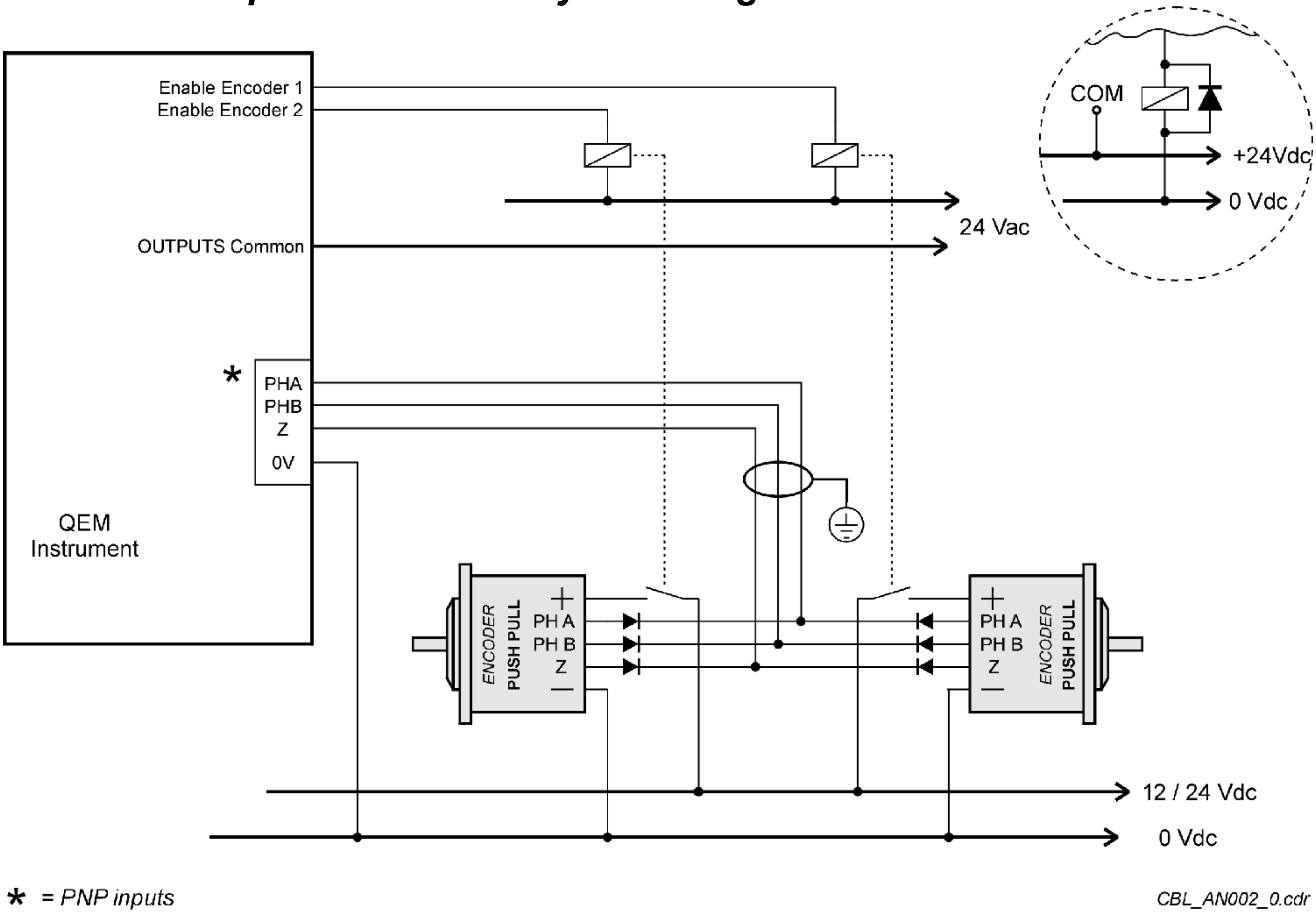
The multiplexer system allows the movimentation of more than one axis with only a driver.
The system handles automatically the teleruptors changing with right timing.



CBL_AN001_0.cdr

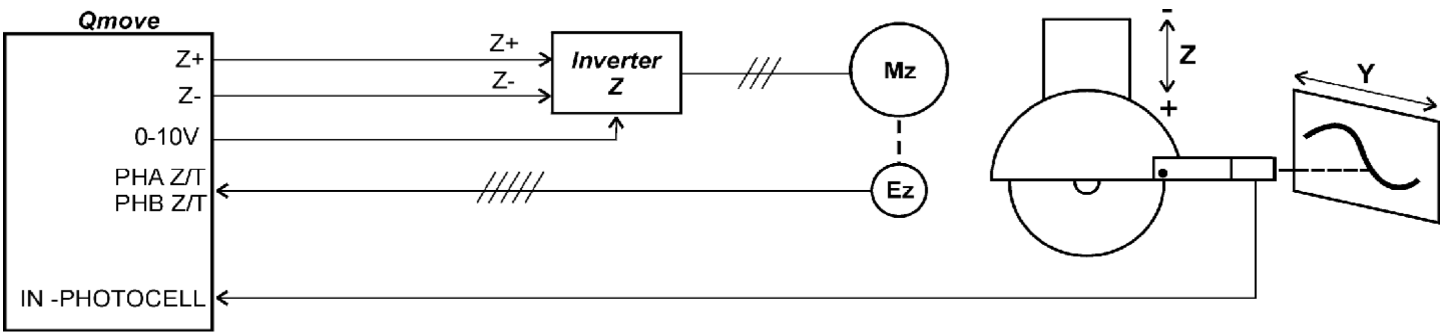
Enable AXIS 1: brake unblocking
Enable AXIS 2: brake unblocking
Enable AXIS 3: brake unblocking
OUTPUTS common: analogical inputs common

7.1.2 Multiplexer encoder system diagram



7.1.3 Shape acquisition system diagram

7.1.3.1 If the photocell is installation on Z axis



8. Assistance

8.1 Service

In order to provide a quick service, we need your help.



a)



b)



c)

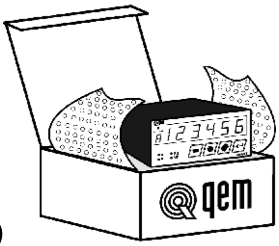
a) *Follow all MIMAT indications (www.qem.it)*

b) *If the problem persist, compile the fax inserted in the MIMAT manual and send to QEM.*

c) *Our technicians will obtain necessary elements for understanding your problem.*

8.2 Sending

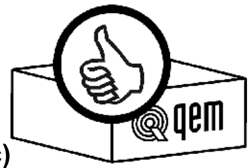
It is recommended to pack properly the instrumentation.



a)



b)



c)

a) Use the original pack

b) Enclose:
- A problem description;
-The part of the electric diagram where the instrument is inserted.
-Instrument programming (set-up, working quotas, parameters...).
- Request a reparation estimate; if not request, it will be calculated at the end.

c) An exhaustive description of the problem allows a quick individuation and resolution of the problem.
A good pack will take care of your instrument.

Motivation
QEM informs the customers that instrumentation delivered not properly packed won't be repaired, except in case that the customer takes all the service responsibilities.

Modulo per Assistenza Tecnica
Module for Technical Service

Ditta / *Firm* :.. Rif.:..

Indirizzo / *Address*:...
....

Tel.. Fax...

E – mail...

Codice strumento / *Instrument Code* :..

Alimentazione strumento / *Power Supply:* ....

Tipo di macchina / *Machine type*:
....
....
....
....
....
....

Descrizione ciclo macchina / *Cycle machine description*:
....
....
....
....
....

Parametri / *Parameters*:
....
....
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....

Descrizione anomalia / *Anomaly Description*:
....
....
....
....
....

Frequenza anomalia / *Anomaly frequency* :

- ☐ Continuo / *Continuous*
- ☐ Saltuario / *Irregular*
- ☐ Dopo un certo tempo / *After a few time*
- ☐ All'accensione / *At the switching on*
- ☐ Allo spegnimento / *At the switching off*
- ☐ Altro / ***Other***: ....

....
....
....
....